DOCUMENT RESUME

ED 200 912 CS 006 005

AUTHOR Scott, Edward; Annesley, Frederick R.
TITLE Some Implications of Cognitive Style for Reading Achievement, and Curriculum Design.
PUB DATE Aug 76
NOTE 38p.; Paper presented at the Annual Meeting of the World Congress on Reading (6th, Singapore, August 1976). For related documents see CS 006 006-008. Some pages may not reproduce well.

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Aptitude Treatment Interaction; *Cognitive Style; *Curriculum Design; Elementary Secondary Education; *Reading Achievement; Reading Instruction; Reading Programs; *Reading Research; *Student Characteristics; Teacher Characteristics; Teacher Role

ABSTRACT

Defining cognitive style as the modes an individual uses in perceiving, organizing, and labelling aspects of his or her environment, this paper is the first in a series concerning some implications of a learner's cognitive style for the development of reading competence. The paper identifies nine dimensions of cognitive style and then provides a review of the literature suggesting that two of the nine dimensions--field dependence/independence and reflectivity/impulsivity--are significantly related to reading achievement. The paper notes that field dependent children tend to make global responses to phenomena and have been shown to have a lower level of reading achievement than field independent children, who tend to perceive things analytically. It notes that impulsive children have also been shown to have a lower level of reading achievement than reflective children. The paper suggests that cognitive styles of students should be taken into account in relation to materials and the teacher's own cognitive style. It concludes that the primary role of the teacher becomes one of a learning diagnostician and program director with the implication that no one instructional program or no one teaching strategy is appropriate for all children. (MKM)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

ED200912

Edward Scott
and
Frederick R. Annesley

Faculty of Education,
James Cook University
of North Queensland,
Australia, 4811.

Some Implications of Cognitive Style for Reading Achievement, and Curriculum Design.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Frederick R. Annesley
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

CS806025

Paper presented at the Sixth World Congress on Reading.
International Reading Association, Singapore, August 1976.

1. The Reading Problem

It is widely accepted that learning to read, as an aspect of languaging, is undoubtedly one of the most important abilities an individual reared in literate cultures must acquire. Indeed, the later development of all other learning skills will depend upon his/her learning to read successfully. In accord with its importance, many attempts have been made to understand the phenomenon of reading - in particular why it is that some children learn to read successfully while other children, of the same apparent general ability, taught by the same teachers, using the same methods and the same reading materials, do not have that success.

As intended solutions to the problem, reading curriculum materials and associated recommended teaching strategies abound - reflecting one emphasis or another relating to the designers views on the nature of learning to read. Yet the voluminous research on how children learn to read is anything but conclusive. After an exhaustive review of the literature in 1967 Jeanne Chall concluded that "... the existing research on beginning reading ... says nothing consistently. It says too much about some things, too little about others. And if you select judiciously and avoid interpretations, you can make the research 'prove' almost anything you want to." (p.87).

In her review, Chall made the point that failure in reading seems to result when a child with a predisposition - a set of characteristics that make it difficult for him/her to establish phoneme-grapheme relationships - is exposed to a method that ignores this predisposition. Attempts to identify, describe and manipulate such predispositions as possible contributors to reading disabilities have been made from a number of perspectives - including psycholinguistics (Goodman, 1968; Kass, 1966; Smith, 1971), visual and auditory perception (Diack, 1960; Spache *et al*, 1962; Vernon, 1958), environmental conditions (Austin, 1961; Seigler, 1960; Vernon, 1958), neuropsychology (Delacato, 1959; Smith and Carrigan, 1959), neurophysiology (French, 1953; Harris, 1957; Kennard, Robinovitch and Wexler 1952), learning methodology (Gates, 1922), and behaviour modification. In particular, the latter orientation has made a concerted effort to provide a theoretical framework (Goss, 1961; Staats *et al*, 1958, 1959, 1961, 1964), as well as a pragmatic intervention methodology, for dealing with children experiencing reading disability (Quay, Werry, McQueen and Sprague, 1966; Glavin, Quay, Annesley, Werry, 1971).

While each of the above approaches has contributed, and continues to contribute, to the understanding and management of reading and reading disability to a greater or lesser extent, ten years after Jeanne Chall's major review we are not much nearer widely applicable, highly

efficacious solutions to the reading problem. Yet new reading curriculum materials continue to appear and enchant the teacher, with no more prospect of being the panacea for developing reading skills than earlier reading programs.

2. Cognitive Style

The thesis of this paper is that a relatively undeveloped area of predispositions, in terms of its educational implications, that of cognitive style, may have potential significance for curriculum design and teaching strategies in relation to the development of reading competence. Cognitive style refers to the "modes" an individual uses in perceiving, organizing and labelling aspects of his/her environment, or, put another way, apprehending, transforming and utilizing information. An historical account of the development of the concept of cognitive style and related research is provided by Kagan and Kogan (1970).

A recent paper by Messick (1970) identifies and describes nine separate dimensions of cognitive style that have been subjected to empirical enquiry - albeit that they differ in the extent of empirical substantiation and in the refinement of the methodologies through which they have been studied. Interpreted perhaps more broadly than Messick intended, and certainly more liberally than the research support available, these dimensions are shown in Figure (1).

FIGURE (1)

Some Dimensions of Cognitive Style

1. *Field dependence* which was identified by Witkin *et al* (1954) and relates to the degree of an individual's dependence of perception of phenomena upon the context in which they occur, that is, is the individual more analytic (field independent) or global (field dependent) in his/her perceptions.

2. *Scope of scanning* - which was first conceptualized by Schlesinger (1954) and refers to the extensiveness and intensity of an individual's attention to phenomena, that is, is the individual broad or narrow in his attention.

3. *Breadth of categorizing* - which was highlighted by Bruner *et al* (1956) and is the extent to which the individual shows a consistent preference for broad or narrow categories in handling phenomena.

4. *Conceptualizing style* - which stems from the work of Gardner (1953) and Gardner and Schoen (1962) and refers to the degree and bases of conceptual differentiation typically used by the individual in dealing with phenomena.

5. *Cognitive complexity* - which can be traced to the work of Kelly (1955) refers to the extent to which the individual construes phenomena in multidimensional and discriminating ways.

6. *Reflectiveness* - which was identified and defined by Kagan *et al* (1964) and refers to the usual relative speed with which an individual selects hypotheses and processes information, that is, is the individual consistently reflective or consistently impulsive in dealing with phenomena.

7. *Information processing* - which was highlighted by Gardner *et al* (1959) using the label leveling vs. sharpening and refers to the preferred style of the individual for incorporating new phenomena into his/her memory matrix, that is, does the individual show a preference for assimilation (leveling) or accommodation (sharpening) in the Piagetian (1926) sense?

8. *Flexibility of control* - which can be traced to the work of Klein (1954) and relates to an individual's susceptibility to distraction and cognitive interference in reacting to phenomena.

9. *Tolerance for incongruous or unrealistic experience* - which was initially brought into focus by Klein and Schlesinger (1951) and refers to the extent to which an individual displays a willingness to accept perceptions at variance with conventional experience.

BEST AVAILABLE COPY

Theoretically, at least, one ought to be able to construct a cognitive profile for learners based on these and/or other identified and substantiated dimensions. Then, theoretically again, one ought to be able to identify and describe a number of more integrative cognitive typologies based upon commonality of orientation. But, as yet, this is speculative and remains in the realm of future research.

Even if we were able to achieve this degree of refinement and given that a knowledge of such typologies may be potentially capable of offering guidance to educators in curriculum design, materials development and teaching methodologies, much further research is essential before such potential may be realized. For example, little is known, in relation to most dimensions, about their sequence of development, their etiology, and their efficacy in terms of the pursuit of the curriculum objectives of the school. Such evidence as is available relating to their trainability is equivocal - tending to be more negative than positive.

Perhaps the most thoroughly researched dimension of cognitive style to date is Witkin *et al*'s (1954) field dependency or the analytic vs. global dimension as it is often known. This dimension has been shown in studies by Zigler (1963a; 1963b), Cohen (1959) and Gardner *et al* (1960) to be correlated with verbal, spatial and general intelligence - such that their effects should be partialed out when the

dimension is related to other variables. Gluck (1973) has found one extreme of the dimension, viz. field independence to be significantly related to reading achievement in first graders. This accords with the work of Frehner (1973), who related field dependency measures to measures of educational achievement in sixth grade children. Frehner's study indicated a significant positive relationship between field independence and reading, spelling and mathematics.

On the other hand, field dependent subjects have been shown to be more sensitive to the social field. They make more use of external sources of information to define their own feelings and attitudes (Witkin *et al*, 1962), are most effective in solving tasks that involve relevant social cues (Keogh *et al*, 1972; Rusle and Nakamura, 1972) and are more alert to socially related verbal materials (Messick and Damarin, 1964; Fitzgibbon *et al*, 1965). Quite apparently, both ends of the field dependency dimension have adaptive qualities and the clear implication is that differential curricula should be devised to benefit both polar types. Given the observed relationships with each pole of the dimension, it is disconcerting to discover that evidence relating to the trainability of this dimension is quite equivocal (Elliott and McMichael, 1963; Wolf, 1965; Jacobson, 1966, 1968; Blade and Watson, 1955; Brinkman, 1966)

The reflectiveness, or impulsivity vs. reflectivity, dimension has also been studied for its relationship with educational achievement. Research has shown that reflective children are less likely to make errors than impulsive children on prose reading tasks (Kagan, 1965b, c), serial learning (Kagan, 1966), word recognition (Kagan, 1965b), arithmetic (Cathcart and Liedtke, 1969), and inductive reasoning tasks (Kagan *et al*, 1966 a). However, the evidence relating to trainability of the dimension is not as clear cut.

Briggs and Weinberg (1973) have reported that it is easier to effect changes in the reflective group than in the impulsive group, that they were less effective in making impulsive subjects become reflective than in training reflectives to be even more so. Studies by Kagan *et al* (1966b), Schwebel (1966), Yando and Kagan (1968), Debus (1970) - the last two in naturalistic settings, i.e. in classrooms - and Denney (1972) suggest that training may modify an individual's response time with very little effect on error rates. The Yando and Kagan, and Debus studies also indicate that impulsive learners can be slowed down under reflective teachers and that constricted reflectives can be freed up, but error rates are relatively unaffected.

A third dimension which has received attention is that of conceptualizing style. Kagan *et al* (1960) have generated a threefold typology for conceptual classification, viz. (i) *descriptive types* - who classify phenomena according to

similarity of some objective, physical attribute of the stimuli (e.g. colour, shape, part), (ii) *relational types* - who classify phenomena in terms of their functional or thematic interdependence, and (iii) *categorical-inferential types* - who classify phenomena in terms of the total class they represent (e.g. things to build with; pieces of furniture). Subsequently, in another study, Kagan *et al* (1963) dropped the 'categorical-inferential' classification and renamed the other two in favour of an analytic - non-analytic (relational) dichotomy. The latter classification system was used by Annesley (1971) in a study of the inter-relationship between conceptualizing style, intelligence and reading achievement in fifth grade boys.

The data of this study suggest that the above average reader uses an analytical style of classification almost twice as much as the below average reader. He is also significantly different from the average reader in style of responding. In effect, the results suggest that the average reader is closer to the below average reader in his use of analytical style than he is to the above average reader. An unexpected result of this study was that subjects with average and above average intelligence (as measured on the Slosson Intelligence Test) gave more non-analytic (relational) style responses than subjects below average in intelligence. Such a finding was unexpected because the non-analytic style of conceptualizing has been viewed by some as developmentally primitive. Annesley's observed relationship

between the analytic style and reading achievement has been supported more recently by Robinson and Gray (1974), who report the analytic style of conceptualizing as the most important contributor in the prediction of school learning (vocabulary, reading comprehension etc.).

3. Implications of Cognitive Style for the Development of a Reading Curriculum

Even from the limited evidence reviewed, there appear strong suggestions that varying cognitive orientations may be differentially related to learning outcomes. Accordingly, the remainder of this paper is an attempt to speculate as to the relationship between the dimension of cognitive style and the development of reading competence.

It is important to note that reading competence refers to a set of abilities which may be described independently of their acquisition process. Indeed, as part of the introduction to this paper it was asserted that learning to read is one of the most important achievements an individual must acquire.

According to Robinson (1966), "... reading involves perception of words, understanding the author's literal, related, and implied meanings; reacting both thoughtfully and emotionally to what is understood, and finally assimilating the ideas gained in such a way as to create new insights, generalizations, ways of thinking and behaving." Basic to this process is competency in recognizing and establishing phoneme-grapheme relationships, in the

recognition of word patterns and meanings, and in recognizing and creating variety of sentence and semantic structure.

Latham (1968) defined the acquisition of reading as being "in common with other developmental processes, ... sequential, having its roots in preschool linguistic and life experience and proceeding through lower-order skills to higher-order reading skills" (p.32). The process culminates in the learner manifesting fluency in interpreting, using and responding to a variety of forms of reading materials as media of communication, manifesting sensitivity to, and appreciation of, the variety of writing styles, content and literary forms likely to be experienced outside the classroom, and in reading for personal intellectual enhancement and for pleasure. How then do we see cognitive style phenomena relating to the development of reading achievement?

Simplistically, reading achievement is pursued through the reading curriculum, which constitutes the materials and planned experiences in relation to them. It is argued that the relationship between cognitive style and the reading curriculum is most critical in the earliest years, for in these years the learner's specific cognitive style is being developed - not only as a result of schooling, but also as a result of the nature of mother-child relationships (Campbell, 1973) influencing his/her ability to master, and gain satisfaction from, reading during the process.

As the curriculum advances in level of sophistication, the relationship swings more in the direction of cognitive style facilitating or inhibiting reading achievement. Thus it is seen that a knowledge of cognitive style phenomena should influence decisions curriculum designers make relating to the scope, format, content, and teaching strategies in the design of a reading curriculum. Similarly, such a knowledge is essential to the specification of teacher roles in relation to operating a reading curriculum. Figure (2) is an attempt to spell out some significant relationships between cognitive style and aspects of the reading curriculum.

The overarching implication for the design of a reading curriculum, generated on the evidence of the differential influence of cognitive style on achievement in reading, is that any such beginning reading curriculum should be eclectic and broadly based. There is little doubt that language experience reading programs teach children *to* read and teach some children *how* to read. Crutch-type reading programs, such as words in colour and the initial teaching alphabet, are also successful in teaching some children how to read. But as panaceas, like all reading programs to date, they have proven ineffective with some children of normal ability with no apparent identifiable causal condition to account for their failure to read. What we are suggesting is that a particular reading program and/or a particular teaching strategy may be inappropriate for the cognitive disposition of some learners. This is not to suggest that this is the only possible cause of

FIGURE (2)

Some Hypothesized Implications of Cognitive Style for Aspects of the Reading Curriculum

Cognitive Style Dimension	Orientation Categories	Implications for Scope	Implications for Content	Implications for Format	Implications for Teaching Strategies
1. Field Dependency	a. analytic vs. b. global	Cognitive styles develop from early childhood, thus a reading curriculum should be influenced by them from prereading through the development of reading competency.	Approach toward attack favours decoding of regularly patterned words and word families Responds best to words and ideas linked with contextual cues and socially oriented content.	Ancillary materials should provide for decoding and encoding (word building) exercises Ancillary materials should provide for word and sentence matching and completion exercises.	Performs best on individually tailored reading program - adaptable to either individual or group situations Performs best on group learning tasks - more responsive to discovery learning.
2. Scope of Scanning	a. broad span of attention vs. b. narrow span of attention			Capable of coping with longer and more complex sentences. Performs best with relatively short and simple sentences.	Individual reading program should specify degree of habituation or modification required. Modification objectives most likely met in teacher-involved group learning contexts. Questioning strategies should be specifically related to the dimension.

BEST AVAILABLE COPY

FIGURE (2) ctd.

Cognitive Style Dimension	Orientation Categories	Implications for Scope	Implications for Content	Implications for Format	Implications for Teaching Strategies
3. Breadth of Categorizing	a. preference for broad categories vs. b. preference for narrow categories	Cognitive styles develop from early childhood, thus a reading curriculum should be influenced by them from prereading through the development of reading competency.		Ancillary reading materials should include exercises and activities which provide opportunities for both orientations	Techniques should be adopted which will promote and habituate both categories
4. Conceptualizing Style	a. descriptive (analytic) vs. relational (non-analytic)		Content should make possible response to conceptual questions on such bases as: subject; topic; theme; ideas; facts; outcomes; sequence in time; relationships of cause and effect, time and place of occurence etc.	Ancillary materials should provide opportunities for word grouping and sentence classification exercises reflecting analytical and relational systems. Reading skill materials should incorporate conceptualizing exercises as part of communication skills	Individualized learning appropriate to reinforcement of style. Teacher-involved group work appropriate to objective of modifying style.

BEST AVAILABLE COPY

BEST AVAILABLE COPY

FIGURE (2) ctd.

Cognitive Style Dimension	Orientation Categories	Implications for Scope	for Content	for Format	for Teaching Strategies
5. Cognitive complexity	a. complex (multidimensional) vs. b. simple (unidimensional)	Cognitive styles develop from early childhood, thus a reading curriculum should be influenced by them from prereading through the development of reading competency.	Reading content should vary in richness of literary quality to permit learners to cope at their own rate.	Exercise types in ancillary materials should permit both orientations to be met.	Teaching activities should recognize both styles, concentrating first on simple statements of plot etc. - elaborated through directed questioning in relation to content.
6. Reflectiveness	a. reflective vs. b. impulsive		Attention should be given to "interest" in both content and question form. The latter should vary in complexity and in demands on higher intellectual processes to accommodate both styles	Would cope well with ancillary work cards and activity sheets. Exercises can be longer and requiring more analytical, synthetical Self correction feedback systems needed. Units should be attractive and interesting to sustain attention.	Performs well on individualized tasks - task oriented - prefers to avoid group work Requires close teacher or peer supervision of tasks. Requires training in use of situational cues.

FIGURE (2) ctd.

Cognitive Style Dimension	Orientation Categories	Implications for Scope	for Content	for Format	for Teaching Strategies
7. Information Processing	a. leveler vs. b. sharpener	Cognitive styles develop from early childhood, thus a reading curriculum should be influenced by them from prereading through the development of reading competency.	Copes with new and challenging settings, ideas and themes	Ancillary materials at all levels should provide opportunities for assimilation and accommodation of ideas, information and lexical meanings	Likely to respond to use of advance organizers. Requires involvement in teacher and small group discussion to broaden style Should be encouraged to utilize wide range of extended reading materials and to engage in creative writing
8. Flexibility of Control	a. distractable vs. b. non-distractable		Distracted by complex and involved ideas and themes	Likely to be distracted by appearance of page crowding and by more than simple illustrations.	Choice of materials will be related to less complicated materials, in appearance. Likely to require more teacher supervision but likely to perform better in individualized learning.
			Can cope with appropriate levels of complexity in ideas and themes.	Not easily distracted by text format or by illustrations	Likely to choose materials more for their interest. Likely to cope with either individual or group learning

BEST AVAILABLE COPY

BEST AVAILABLE COPY

FIGURE (2) ctd.

Cognitive Style Dimension	Orientation Categories	Implications for Scope	for Content	for Format	for Teaching Strategoes
9. Tolerance of Incongruities	a. tolerant vs. b. intolerant	Cognitive styles develop from early childhood, thus a reading curriculum should be influenced by them from pre-reading through the development of reading competency.	Likely to respond well to fantasy and humour Likely to show a preference for materials based on realism. Themes should be reality based	Responds well to the incongruent Incongruity stimulates motivation and creativity Responds adversely to situations such as humanizing animals or fantasy	Likely to accept humour and to respond to less formal learning context Likely to respond better to more "serious" learning contexts. Likely to show a preference for routine.

the phenomenon. As Vernon (1971) points out, "actual reading achievement depends not only on the possession of the necessary cognitive abilities but also on the child's motivation, his will to acquire and operate these abilities" (p.5).

From Figure (2), it is obvious that our knowledge of cognitive style to date offers little guidance for the scope of a reading curriculum other than to indicate the need to accommodate, within a reading program, to the wide range of cognitive orientations learners bring to the reading task and that need to be developed in pursuit of the task. Guidance as to the scope of the reading curriculum best follows from Latham's (1968) assessment of the development process.

In terms of format, the relationships postulated in Figure (2) necessitate the reading curriculum being viewed as a bank of multimodal resource materials that will facilitate the development, habituation, reinforcement, remediation and extension on the part of the learner (working individually or in small or large groups) of the wide range of specific reading abilities essential in the development of reading competency.

More specifically the evidence (Witkin *et al*, 1954) that field dependent children rely heavily upon contextual cues in learning to read highlights the need for care being given to textual relevance, quality and quantity and placement of artwork in the reading materials. This problem must be

approached with sensitivity, for evidence relating to the study of the dimension of flexibility of control (Klein, 1954) points to the need for the design of reading materials to avoid, and to facilitate the control of, distraction on the part of the learner.

Two other dimensions appear to have import for format, viz. reflectiveness and scope of scanning. Studies of reflectiveness and impulsivity suggest a higher error tendency on the part of "impulsive" learners (Kagan, 1965b). To encourage such learners to become less impulsive, the reading program, where appropriate, should incorporate self-correction and feedback systems. Evidence relating to the scope of scanning (Schlesinger, 1954), or breadth of attention, suggests that, particularly in early-level reading materials, there is a need to accommodate variations in span of attention. This may be achieved through appropriate variations in the length of text and total materials design.

Variations in cognitive style, as implied in Figure (2), also have significant implications for the selection of content for a reading curriculum. The socially oriented disposition of field dependent children (Witkin, 1962 and Keogh *et al*, 1971) points directly to the need to include material dealing with social situations and issues relevant to the culture in which the learner is growing up, and appropriate to his/her level of experience. To facilitate both leveling (assimilation) and sharpening (accommodation) as

styles of information processing (Gardner *et al*, 1959), the range of reading content should include both familiar and novel ideas, themes and topics. In addition, such content should recognize variations in the predisposition of learners to display tolerance, or a lack of it, (Klein and Schlesinger, 1951) in relation to incongruous or unrealistic experiences. This argues for a balance between realism and fantasy in content.

The content of a reading curriculum should also include a systematic development of word attack and comprehension abilities. The materials to facilitate this development should reflect an awareness of the different field dependency orientations of learners. It is suggested that some children, analytic, or field independent, learners will respond best to a linguistic program of regularly patterned, unlockable words coupled with some irregularly patterned or "sight" words. Others, the global, or field dependent, children will require contextual cues such as word configurations, associated illustrations, or the remainder of the sentence in which it is embedded, to unlock even regularly patterned words. In both cases word attack will be assisted when, in early reading, the vocabulary and sentence structures are child-centred and idiomatic.

As Robinson (1966) has pointed out, reading involves processing what is read - classifying, relating, identifying, comparing, seeking cause and effect, understanding main ideas, following directions and the like. Accordingly, the

curriculum should include materials and tasks specifically designed to promote and accommodate the variations in conceptualizing style identified by Kagan *et al* (1960).

It is clear from Figure (2) and from many comments in the literature that differences in cognitive style have significant implications for teaching strategies. According to Hall and Russell (1974), "teachers unaware of the native response tendency may make school an unhappy place for children by unnecessarily and inappropriately hurrying the reflectives or slowing the impulsives" (p.933). Similarly, Grieve and Davis (1971) report that "the more global a male is the more he is likely to benefit from discovery instruction which is designed to develop knowledge" (p.139). Then, as Dreyer *et al* (1973) conclude, "... the effectiveness of a particular style may vary with situational factors ... the evidence is persuasive that field independence has been the preferred strategy in traditional educational activities which have required task orientation" (p.411).

We do not intend in this paper to describe the large range of teaching strategies which may be utilized in pursuing the reading curriculum to develop reading competence. However we do wish to stress the absolute necessity for each child to be treated as a unique learner and for instructional modes to be chosen for specific tasks in accordance with the teacher's appreciation of the learner's pattern of styles on the range of cognitive dimensions. Regrettably, this is likely to be a trial and error process until a tested paradigm of

relationships between cognitive styles and instructional strategies is generated. An interesting discussion of management and instructional strategies may be found in Johnson, Berkeley and Scott (1975).

In the matching of styles to strategies, there is the problem of the confounding effect of the teacher's own cognitive style in the teaching process. We have already cited evidence, by Yando and Kagan (1968) and Debus (1970), which suggests that the cognitive style of teachers, either deliberately or unwittingly, may be a significant variable influencing the efficacy of particular instructional strategies applied to some learners. The implication of this possibility stresses the need for teachers to be fully aware of their own cognitive dispositions.

Finally, differences in the cognitive style of learners have implications for the traditional roles of teachers - particularly in relation to the reading curriculum. In summary, the primary roles of the teacher become those of a learning diagnostician and program director in which she matches appropriate reading materials, learning contents and the learning styles of individual children or groups of children. The inference is that because of the known variation in cognitive styles, no one instructional program or no one teaching strategy is appropriate for all children. Interrelated with the roles of diagnostician and director are those of reading materials evaluator and designer. By no means least in importance is that of evaluator-critic providing valuable feedback to teacher and learner alike.

4. Conclusion

The purpose of this paper has been to open up a new and potentially fruitful avenue for the pursuit of reading competence. The research evidence for the existence and reliability of nine dimensions of cognitive style is strong, while the evidence of the relationship of those dimensions with school achievement in general and reading achievement in particular is still somewhat tenuous.

Accordingly, we have been both assertive and speculative in our views on the relationship between cognitive style and reading achievement. In general terms we have indicated what we believe to be the implications of cognitive style for the design and implementation of a reading curriculum. We have omitted the fine detail. No where is this more apparent than in our reference to teaching strategies. In the absence of a research base for asserting relationships between cognitive styles of learners, teacher characteristics and instructional formats we have done no more than raise the problem. Yet we take comfort in the support of Kogan (1971), who concludes, as do we - "Though the practical pay-offs of cognitive style research are still quite meager for the teacher, the promise of future rewards is strongly indicated if energy and imagination are applied to the task" (p.292).

BIBLIOGRAPHY

Annesley, F.R. Cognitive style as a variable in the reading achievement and intelligence of boys. *Dissertation Abstracts International*, 1971, *32*, 1910-A.

Annesley, F.R., Odhner, F., Madoff, E., and Chansky, N. Identifying the first grade underachiever. *The Journal of Educational Research*, 1970, *63*, 459-462.

Attneave, F. and Olsen, R.K. Discriminability of stimuli varying in physical and retinal orientation. *Journal of Experimental Psychology*, 1967, *74*, 149-157.

Austin, M.C., Bush, C.L., and Huebner, M.H. *Reading Evaluation*, New York: Ronald Press, 1961.

Bjorklund, D.F., and Butler, E.J. Can cognitive impulsivity be predicted from classroom behavior? *Journal of Genetic Psychology*, 1973(Dec), *123*, (2), 185-194.

Blade, M., and Watson, W.S. Increase in spatial visualization test scores during engineering study. *Psychological Monographs*, 1955, *69*, (12, Whole No. 397).

Blanton, W.E., and Bullock, T. Cognitive Style and reading behavior. *Reading World*, 1973 (May), *12*, (4), 276-287.

Briggs, C.H., and Weinberg, R.A. Effects of reinforcement in training children's conceptual tempos. *Journal of Educational Psychology*, 1973, *65*, (3), 383-394.

Brinkmann, E.H. Programmed instruction as a technique for improving spatial visualization. *Journal of Applied Psychology*, 1966, *50*, 179-184.

Bruner, J.S., Goodnow, J.J., and Austin, G.A. *A study of thinking*. New York: Wiley, 1956.

Butler, L.G. A psycholinguistic analysis of the oral reading behavior of selected impulsive and reflective second grade boys. *Dissertation Abstracts International*, 1973(M), *33*, (11A), 5960-61.

Campbell, S.B. Mother-child interaction in reflective, impulsive, and hyperactive children. *Developmental Psychology*, 1973(M), *8*, (3), 341-349.

Cathcart, G., and Liedtke, W. Reflectiveness/impulsiveness and mathematics achievement. *The Arithmetic Teacher*, Nov. 1969, 563-367.

Chall, J.S. *Learning to read: The great debate*. New York: McGraw-Hill, 1967.

Cohen, J. The factorial structure of the WISC at ages 7-6, 10-6 and 13-6. *Journal of Consulting Psychology*, 1959, *23*, 285-299.

Covington, M.V. Training for creative understanding in reading: some experimental evidence. In R.G. Stauffer (Ed), *Reading and the cognitive processes, highlights of the 1966 preconvention institutes.* Neward, Delaware: International Reading Association, 1967, 13-22.

Crutchfield, B., Woodworth, D. and ALbrecht, R. Perceptual performance and the effective person. Lackland AFB, Texas: USAF, 1959 (WADC Tecox. Note, No. 58-60).

Davis, A.J. Cognitive style: methodological and develcpmental considerations. *Child Development*, 1971, *42*, 1447-1459.

Debus, R.L. Effects of brief observation of model behavior on conceptual tempo of impuslive children. *Developmental Psychology*, 1970, *2*, 22-32.

Delacato, C.H. *The treatment and prevention of reading problems: the neuro-psychological approach.* Springfield, Illinois: Charles C. Thomas, 1959.

Denney, M. Modelling effects upon conceptual style and cognitive tempo. *Child Development*, 1972, *43*, 105-119.

Diack, H. *Reading and the psychology of perception.* Nottingham: Peter Skinner Publishing Ltd., 1960.

Dryer, A.S., McIntire, W.G., and Dreyer, C.A. Sociometric status and cognitive style in kindergarten children. *Perceptual and Mctor Skills*, 1973 (Oct.),*37*, (2), 407-412.

Elliott, P., and McMichael, R.E. Effects of specific training on frame dependence. *Perceptual and Motor Skills*, 1963, *17*, 363-367.

Farquhar, W.W. and Payne, D.A. A classification and comparison of techniques used in selecting under- and over-achievers. *Personnel and Guidance Journal*, 1964, *42*, (9), 874-884.

Field, T.W. Cognitive Style, critical thinking and science orientation. Armidale, N.S.W. University of New England, 1971. (Ph.D. Thesis).

Fitzgibbon, D., Goldberger, L., and Eagle, M. Field dependence and memory for incidental materials. *Perceptual and Motor Skills*, 1965, *21*, 743-749.

Frederick, W. Information processing and concept learning at grades 6, 8, and 10 as a function of cognitive style. Technical report 44, Research and Development Centre for Cognitive Learning, University of Wisconsin, Madison, 1967.

Frehner, V.L. Cognitive Style as a Determinant of educational achievement among sixth grade elementary school students. *Dissertation Abstracts International*, 1973 Jan, *33*, (7-A) 3379-3380.

French, E. Kinesthetic recognition in retarded readers. *Educational and Psychological Measurement*, 1953, *13*, 636-654.

Gardner, R.W. Cognitive styles in categorizing behavior. *Journal of Personality*, 1953, *22*, 214-233.

Gardner, R.W., Holzmann, P.S., Klein, G.S., Linton, H.B., and Spence, D.P. Cognitive control: A study of individual consistencies in cognitive behavior. *Psychological Issues*, 1959, *1*, (Monograph 4).

Gardner, R.W., and Schoen, R.A. Differentiation and abstraction in concept formation. *Psychological Monographs*, 1962, *76*, (41, Whole No. 560).

Gardner, R.W., Jackson, D.N., and Messich, S.J. Personality organization in cognitive controls and intellectual abilities. *Psychological Issues*, 1960, *2*, (Monograph 8).

Gates, A.R. Psychology of reading and spelling with special reference to disability, contributions to education. *Bureau of Publications Teachers College*, Columbia University, New York: 1922, No. 129.

Glavin, J.P., Quay, H.C., Annesley, F.R., and Werry, J.S. An experimental resource room program for classroom behavior problem children. *Journal of Exceptional Children*, 1971, *38*, (2), 131-137.

Gluck, E.A. Psychological differentiation and reading achievement in first grade children. *Dissertation Abstracts International*, 1973 (Aug), *3*, (1-B), 412.

Goodenough, D.R., and Eagle, C.J. A modification of the embedded-figures test for use with young children. *Journal of Genetic Psychology*, 1963, *103*, 67-74.

Goodman, K.S. (Ed.) *The psycholinguistic nature of the reading process*. Detroit: Wayne State University Press, 1968.

Goss, A.E. Verbal mediating response and concept formation. *Psychological Review*, 1968, *68*, 248-274.

Grieve, T.D., and Davis, J.K. The relationship of cognitive style and method of instruction to performance in ninth grade geography. *The Journal of Educational Research*, 1971, *65*, (3), 137-141.

Hall, V.C., and Russell, W.J. Multitract-multimethod analysis of conceptual tempo. *Journal of Educational Psychology*, 1974, *66*, (6), 932-939.

Harris, A.J. Lateral dominance, directional confusion, and reading disability. *Journal of Psychology*, 1957, *44*, 283-294.

Henry, F.P. Effect of reinforcement conditions on a discrimination learning task for impulsive versus reflective children. *Child Development*, 1973, *44*, 657-660.

Jacobson, G.R. Effect of brief sensory deprivation on field dependence. *Journal of Abnormal Psychology*, 1966, *71*, 115-118.

Jacobson, G.R. Reduction of field dependence in chronic alcoholic patients. *Journal of Abnormal Psychology*, 1968, *73*, 547-549.

Johnson, F.C., Berkeley, E.F., and Scott, E. *Endeavour reading program. Teacher's Manual - prereading to stage 18.* First Edition, Jacaranda Press, Milton, Queensland, 1975.

Kagan, J. Impulsive and reflective children: Significance of conceptual tempo. In J.D. Krumboltz (Ed.) *Learning and the educational process.* Chicago: Rand McNally, 1965c, 133-161.

Kagan, J. Reflection - impulsivity and reading ability in primary grade children. *Child Development*, 1965b, *36*, 609-628.

Kagan, J. Reflection - impulsivity. The generality and dynamics of conceptual tempo. *Journal of Abnormal Psychology*, 1966, *71*, 17-24.

Kagan, J. The acquisition and significance of sex typing and sex role identity. In M. Hoffman and L. Hoffman (Eds.), *Review of child development research.* Vol. 1, New York: Russell Sage, 1964, 137-167.

Kagan, J., and Kogan, N. Individual variation in cognitive processes. In P. Mussen (Ed.) *Carmichael's Manual of Child Psychology*, Vol. 1, New York: Wiley, 1970, 1273-1365.

Kagan, J., Pearson, L., and Welch, L. Conceptual impuslivity and inductive reasoning. *Child Development*, 1966a, *37*, 583-594.

Kagan, J., Pearson, L., Welch, L. Modifiability of an impulsive tempo. *Journal of Educational Psychology*, 1966b, *57*, 339-365.

Kagan, J., Moss, H.A., and Sigel, J.E. Conceptual style and the use of affect labels. *Merrill-Palmer Quarterly*, 1960, *6*, 261-278.

Kagan, J., Moss, H.A., and Sigel, J.E. Psychological significance of styles of conceptualization. In J.C. Wright and J. Kagan (Eds.) Basic cognitive processes in children. *Monographs of the Society for Research in Child Development*, 1963, *28*, (2), (Serial No. 86).

Kass, C.E. Psycholinguistic disabilities of children with reading problems. *Journal of Exceptional Children*, 1966, *32*, (8), 533-539.

Kelly, G.A. *The Psychology of personal constructs.* Vol. 1, New York: Norton, 1955.

Kennard, M.A., Robinovich, R., and Wexler, D. The abnormal electroencephelogram as related to reading disability in children with disorders of behavior. *Canadian Medical Association Journal*, 1952, *67*, 330-333.

Keogh, B.K., Welles, M.F., and Weiss, D.L. *Field dependence-independence, reflection-impulsivity and problem solving styles of pre-school children.* Los Angeles: University of California, 1972. (Technical Report, SERP 1972-A1).

Klein, G.S., and Schlesinger, H.J. Perceptual attitudes toward instability. I: Prediction of apparent movement experiences from Rorschach responses. *Journal of Personality*, 1951, *19*, 289-302.

Klein, G.S. Need and regulation. In M.R. Jones (Ed.) *Nebraska Symposium on motivation.* Lincoln: University of Nebraska Press, 1954, 224-274.

Kogan, N. Educational implications of cognitive style. In G.S. Lesser, *Psychology and Educational Practice,* Illinois: 1971, 242-292.

Krippner, S. Hypnosis and reading improvement among university students. *American Journal of Clinical Hypnosis*, 1963, *5*, 187-193.

Latham, W. Are Today's Teachers Adequately Trained for the Teaching of Reading? In Downing, J. and Brown, A.L. (Eds). *Today's Child and Learning to Read,* 3rd International Reading Symposium, Southampton, 1966, (London, Cassell, 1968).

Lee, L.C., Kegan, J., and Rabson, A. Influence of a preference for analytic categorization upon concept acquisition. *Child Development*, 1963, *34*, 433-442.

Mann, L. Differences between reflective and impuslive children in tempo and quality of decision making. *Child Development*, 1973, *44*, 274-279.

Massari, D.J., and Massari, J.A. Sex differences in the relationship of cognitive style and intellectual functioning in disadvantaged pre-school children. *Journal of Genetic Psychology*, 1973 (June), *122*, (2), 175-181.

Messick, S. The criterion problem in the evaluation of instruction: Assessing possible, not just intended outcomes. In M.C. Wittrock & D. Wiley (Eds.), *The Evaluation of Instruction: Issues and problems.* New York: Holt, Rinehart, and Winston, 1970.

Messick, S., and Damarin, F. Cognitive style and memory for faces. *Journal of Abnormal Psychology*, 1964, *69*, 313-318.

Phillip, H., and Kelly, M. Product and process in cognitive development: some comparative data on the performance of school age children in different cultures. *British Journal of Educational Psychology*, 1974, *44*, (3), 248-265.

Piaget, J. *The Language and Thought of the Child*. New York: Harcourt Brace Jovanovitch, 1926.

Poole, M. Understanding cognitive style as a basis for curricula implementation in inner suburban schools. In O.E. Edgar, *Sociology of Australian Education: A book of Readings*. McGraw-Hill, 1975, 169-185.

Quay, H.C., Werry, J.S., McQueen, N., and Sprague, R. Remediation of the conduct problem child in the special class setting. *Exceptional Children*, 1966, *32*, 509-515.

Robinovitch, R.D. Reading and learning disabilities. In S. Arieti (Ed.) *American Handbook of Psychiatry*. New York: Basic Books, 1959.

Robinson, H.M. The major aspects of reading. In H.A. Robinson (Ed.) *Reading: Seventy-Five Years of Progress*. Chicago: University of Chicago Press, 1966.

Robinson, J.E., and Gray, J.L. Cognitive style as a variable in school learning. *Journal of Educational Psychology*, 1974, *66*, (5), 793-799.

Ruble, D.W., and Nakamura, C.Y. Task versus social orientation in young children and their attention to relevant social cues. *Child Development*, 1972, *43*, 471-480.

Russell, D.H. *Children's Thinking*. Waltham, Massachusetts: Blaidsell, 1956.

Russell, D.H. Research on the processes of thinking with some applications to reading. *Elementary English*, 1965, *42*, 370-378.

Schleifer, M., and Douglas, V.I. Moral judgements, behavior and cognitive style in young children. *Canadian Journal of Behavioural Science*, 1973 (Apr), *5*, (2), 133-144.

Schlesinger, H.J. Cognitive attitudes in relation to susceptibility to interference. *Journal of Personality*, 1954, *22*, 354-374.

Schwebel, A.I. Effects of impulsivity on performance of verbal tasks in middle- and lower- class children. *American Journal of Orthopsychiatry*, 1966, *36*, (1), 13-21.

Scott, N.C. Jnr., Cognitive style and inquiry strategy: A Five year study. *Journal of Research in Science Teaching*. 1973, *10*, (4), 323-330.

Seigler, H.G., and Gynther, M.D. Reading ability of children and family harmony. *Journal of Developmental Reading*, 1960, *4*, 17-24.

Sinclair, K.E., Hays, T.A., and Kemmis, S. deC. Anxiety and cognitive processes in problem solving. *Australian Journal of Education*, 1974, *18*, (3), 239-254.

Smith, D.E.P., and Corrigan, P.M. *The nature of reading disability*. New York: Harcourt, Brace, 1959.

Smith, F. *Understanding reading: a psycholinguistic analysis of reading and learning to read*. New York: Holt, Rinehart, and Winston, 1971.

Spache, G.D., and Tillman, C.E. A comparison of the visual profiles of retarded and non-retarded readers. *Journal of Developmental Reading*, 1962, *5*, 101-109.

Staats, A.W. *Human learning: studies extending conditioning principles to complex behavior*. New York: Holt, Rinehart, and Winston, 1964.

Staats, A.W. Verbal habit families, concepts, and the operant conditioning of word classes. *Psychological Review*, 1961, *68*, 190-204.

Staats, A.W., Staats, C.K., and Biggs, D.H. Meaning of verbal stimuli changed by conditioning. *American Journal of Psychology*, 1958, *71*, 429-431.

Staats, A.W., Staats, C.K., and Heard, W.G. Language conditioning of meaning to meaning using a sematic generalization paradigm. *Journal of Experimental Psychology*, 1959, *57*, 187-192.

Stanes, D. Analytic responses to conceptual style test as a function of instructions. *Child Development*, 1973, *44*, 389-391.

Stauffer, R.G. Language and the habit of credulity. *Elementary English*, 1956, *42*, 362-369.

Vernon, M.D. *Backwardness in reading*. Cambridge, University Press, 1958.

Vernon, M.D. *Reading and its difficulties - a psychological study*. Cambridge: University Press, 1971.

Wallach, M.A., and Kogan, N. *Modes of thinking in young children*. New York: Holt, Rinehart, and Winston, 1966.

Watts, B.H. Implications of cognitive styles for the classroom. Paper presented at the Australian Institute of Aboriginal Studies Biennial Conference, May, 1974.

Witkin, H.A., Dyk, R.B., Faterson, H.F. Goodenough, D.R. and Karp, S.A. *Psychological differentiation*. New York: Wiley, 1962.

Witkin, H.A., Lewis, H.B., Hertzman, M., Machover, K., Meissner, P.B. and Wapner, S. *Personality through perception*. New York: Harper and Row, 1954.

Wolf, A. Body rotations and the stability of field dependence. *Journal of Psychology*, 1965, *59*, 211-217.

Yando, R.M., and Kagan, J. The effect of teacher tempo on the child. *Child Development*, 1968, *39*, 27-34.

Zigler, E. Zigler stands firm. *Contemporary Psychology*, 1963B, *8*, 459-461.

Zigler, E. A measure in search of a theory. *Contemporary Psychology*, 1963a, *8*, 133-135.

Nunney, D.N. Educational cognitive style: A basis for personalizing instruction. *Educational Scientist, Journal of American Education Science Association, 1,* (1), 13-26.

Paclisanu, M.I. Interacting effects of field-dependence, stimulus deprivation and two types of reinforcement upon problem solving in elementary school children. *Dissertation Abstracts International,* 1970, *31,* 2290B-2291B. (University Microfilms No. 70-19,763).

Raab, T.J. An experimental study exploring the relationship between various types of reinforcement, cognitive style and learning among sixth grade students (Doctoral dissertation, Rutgers University, 1973). *Dissertation Abstracts International,* 1974, *35,* 2059A. (University Microfilms No. 74-21,861).

Randolph, L.C. A study of the effects of praise, criticism and failure on the problem solving performance of field-dependent and field-independent individuals. *Dissertation Abstracts International,* 1971, *32,* 3014B-3015B. (University Microfilms No. 71-28,555).

Robinson, H.M. The major aspects of reading. In H.A. Robinson (Ed.), *Reading: Twenty-Five Years of Progress.* Chicago: University of Chicago Press, 1966.

Robinson, J.E., & Gray, J.L. Cognitive Style as a variable in school learning. *Journal of Educational Psychology,* 1974, *66,* (5), 793-799.

Roettger, D.M. The effects of directed and non-directed training upon the visual discrimination performance of reflective and impulsive children. Unpublished doctoral dissertation, University of Iowa, 1971.

Sawyer, D.J. The diagnostic mystique - a point of view. *The Reading Teacher,* 1974, March, 555-561.

Santostefano, S. Rutledge, L. & Randall, D. Cognitive styles and reading disability. *Psychology in Schools,* 1965, *2,* 57-62.

Scott, E. & Annesley, F.R. *Some Implications of Cognitive Style for Reading Achievement, and Curriculum Design.* Paper presented to the Sixth World Congress on Reading Singapore, August, 1976. Obtainable from Department of Education, Post Office, James Cook University, N.Q., 4811, Australia.

Silverton, R.A. What mathemagenic effects and cognitive styles research should mean to the reading educator. Paper presented at the Annual Meeting of Western College Reading Association, 1975.

Smith, K.M. The influence of cognitive style and intelligence variables in aided reading comprehension. (Doctoral Dissertation, University of Wisconsin) Ann Arbor, Michigan: University Microfilms, 1973, No. 74-3, 550).